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Application Number 10/678,280
Amendment dated August 4, 2008
Response to Office Action mailed May 2, 2008

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended) A method comprising:

managing state information within a primary control unit included within a device, wherein the state information comprises information (i) representing a current state of a consumer included within the device; (ii) ~~updated by the primary controller during operation of the consumer within the device, and (iii) upon a transfer of control of the device from the primary control unit to a standby control unit included within the device, utilized by the standby control unit to take control of the device from the primary control unit without having to relearn the state information~~

receiving, with the primary control unit, a change to the state information; and
prior to communicating the change[[s]] to the consumer of the state information included within the device, communicating to [[the]] a standby control unit included within the device the change[[s]] performed by the primary control unit to the state information to synchronize the state information between the primary and standby control units; and
after synchronizing the state information between the primary and standby control units, communicating, with the primary control unit, the change to the consumer to update consumer state information maintained within the consumer.

Claim 2 (Currently Amended) The method of claim 1, wherein communicating the change[[s]] to the state information to the[[a]] standby control unit comprises communicating the change[[s]] to the state information in accordance with an order that requires the change[[s]] to be communicated to the standby control unit prior to communicating the change[[s]] to the consumer of the state information.

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Claim 3 (Currently Amended) The method of claim 1,
wherein managing state information comprises managing state information within a temporally-ordered data structure, and
wherein communicating the change[[s]] to the standby control unit comprises replicating the temporally-ordered data structure within the standby control unit.

Claim 4 (Currently Amended) The method of claim 3, wherein communicating the change[[s]] to the consumer comprises communicating the change[[s]] to the state information to the consumer[[s]] in accordance with the data structure.

Claim 5 (Currently Amended) The method of claim 3, wherein managing the state information comprises utilizing a commit proposal and a commit marker to identify a portion of the state information.

Claim 6 (Currently Amended) The method of claim 5, wherein utilizing [[a]]the commit proposal and [[a]]the commit marker comprises:
setting the commit proposal to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer; and
setting the commit marker to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer and for which an acknowledgement has been received from the consumer.

Claim 7 (Original) The method of claim 6, further comprising setting a flag that indicates to the consumer that the commit proposal has been set.

Claim 8 (Original) The method of claim 6, further comprising resetting the commit marker to the object identified by the commit proposal in response to receiving the acknowledgement.

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Claim 9 (Original) The method of claim 5, further comprising:
replicating the commit proposal and the commit marker to the standby control unit; and
communicating a portion of the replicated temporally-ordered data structure that is
bounded by the replicated commit proposal and the replicated commit marker to the consumer
from the standby control unit in the event the primary control unit fails.

Claim 10 (Original) The method of claim 9, further comprising issuing a communication from
the primary control unit to cause the standby control unit to set the replicated commit proposal to
identify a most recent object of the replicated temporally-ordered data structure that has not been
acknowledged by the consumer.

Claim 11 (Currently Amended) The method of claim 10, further comprising issuing another
communication from the primary control unit to cause the standby control unit to set the
replicated commit marker to identify a most recent object of the replicated temporally-ordered
data structure that has been communicated to the consumer and for which an acknowledgement
has been received from the consumer.

Claim 12 (Currently Amended) The method of claim 11, wherein issuing the other
communication to cause the standby control unit to set the replicated commit marker further
causes the standby control unit to set the replicated commit marker to the object identified by the
replicated commit proposal in response to receiving the acknowledgement.

Claim 13 (Currently Amended) The method of claim 5, wherein utilizing [[a]]the commit
marker and the commit proposal further comprises deleting a least recent object of the
temporally-ordered data structure that is not bounded by the commit marker and the commit
proposal.

Claim 14 (Currently Amended) The method of claim 1, wherein managing the state
information comprises storing the state information within a set of objects.

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Claim 15 (Currently Amended) The method of claim 14, ~~further comprising:~~
wherein the change comprises one of a plurality of changes,
wherein receiving the changes comprises receiving event messages indicating the changes
to the state information; and
the method further comprising linking the objects of the data structure in accordance with
an order in which the event messages are received to form a temporally-ordered data structure.

Claim 16 (Currently Amended) A method comprising:
maintaining, with a primary control unit of a device, state information within a
temporally-ordered data structure, wherein the state information comprises information (i)
representing a current state of a consumer included within the device, ~~(ii) updated by the primary~~
~~controller during operation of the consumer within the device, and (iii) upon a transfer of control~~
~~of the device from the primary control unit to a standby control unit included within the device,~~
~~utilized by the standby control unit to take control of the device from the primary control unit~~
~~without having to relearn the state information;~~

communicating a portion of the state information that corresponds to a change in the state
information to the consumer included within the device so as to update consumer state
information maintained by the consumer with the change; and

encoding a commit proposal and a commit marker within the temporally-ordered data
structure to identify the portion of the state information communicated to the consumer.

Claim 17 (Original) The method of claim 16, wherein the data structure comprises a plurality
of objects, and wherein maintaining state information comprises storing the state information
within the objects.

Claim 18 (Original) The method of claim 17, further comprising:
setting the commit proposal to identify a most recent one of the objects communicated to
the consumer; and
setting the commit marker to identify a most recent one of the objects communicated to
the consumer for which an acknowledgement has been received from the consumer.

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Claim 19 (Original) The method of claim 18, further comprising setting a flag that indicates to the consumer that the commit proposal has been set.

Claim 20 (Original) The method of claim 18, further comprising:
receiving an update request from the consumer;
identifying a second portion of the temporally-ordered data structure that contains objects more recent than the object identified by the commit proposal; and
communicating state data associated with the second portion of the temporally-ordered data structure to the consumer in response to the request.

Claim 21 (Original) The method of claim 20, further comprising updating the commit proposal to identify the most recent of the identified objects of the temporally-ordered data structure.

Claim 22 (Original) The method of claim 21, further comprising:
receiving an acknowledgement from the consumer; and
updating the commit marker to identify the object identified by the commit proposal in response to the acknowledgement.

Claim 23 (Currently Amended) The method of claim ~~16~~7, further comprising communicating the change[[s]] to the state information to a standby control unit included within the device before communicating the changes to the consumer.

Claim 24 (Currently Amended) The method of claim 23, wherein communicating the change[[s]] to the state information to ~~[[a]]the~~ standby control unit comprises communicating the change[[s]] to the state information in accordance with an order that requires the change[[s]] to be communicated to the standby control unit prior to communicating the change to the consumer.

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Claim 25 (Currently Amended) The method of claim 23, wherein the change comprises one change of a plurality of changes, the method further comprising:

receiving event messages indicating the changes to the state information; and
linking the objects of the data structure in accordance with an order in which the event messages are received.

Claim 26 (Currently Amended) A device comprising:

a primary control unit;
a standby control unit; and
a consumer,

wherein the primary control unit manages state information, receives a change to the state information, and communicates the change[[s]] to the state information to the standby control unit before communicating the changes to the consumer to synchronize the state information between the primary and standby control units, and after synchronizing the state information between the primary and standby control units, communicates the change to the consumer to update consumer state information maintained within the consumer with the change, and

wherein the state information comprises information (i) representing a current state of the consumer included within the device, (ii) updated by the primary controller during operation of the consumer, and (iii) upon a transfer of control of the device from the primary control unit to the standby control unit, utilized by the standby control unit to take control of the device from the primary control unit without having to relearn the state information;

Claim 27 (Currently Amended) The device of claim 26, wherein communicating the change[[s]] to the state information to [[a]] the standby control unit comprises communicating the change[[s]] to the state information in accordance with an order that requires the change[[s]] to be communicated to the standby control unit prior to communicating the change[[s]] to the consumer.

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Claim 28 (Currently Amended) The device of claim 26, wherein the primary control unit manages the state information within a temporally-ordered data structure and communicates the state change[[s]] by replicating the temporally-ordered data structure within the standby control unit.

Claim 29 (Currently Amended) The device of claim 28, wherein the primary control unit communicate the change[[s]] to the state information to the consumer in accordance with the temporally-ordered data structure.

Claim 30 (Previously Presented) The device of claim 28, wherein the primary control unit utilizes a commit proposal and a commit marker to identify a portion of the state information.

Claim 31 (Previously Presented) The device of claim 30, wherein the commit proposal and the commit marker identify the portion of the state information within the data structure that has been communicated to the consumer.

Claim 32 (Previously Presented) The device of claim 30, wherein the primary control unit sets the commit proposal to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer, and sets the commit marker to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer and for which an acknowledgement has been received from the consumer.

Claim 33 (Previously Presented) The device of claim 32, wherein the primary control unit sets a flag that indicates to the consumer that the commit proposal has been set.

Claim 34 (Previously Presented) The device of claim 32, wherein the primary control unit further sets the commit marker to the object identified by the commit proposal in response to receiving the acknowledgement.

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Claim 35 (Previously Presented) The device of claim 30, wherein the primary control unit replicates the commit proposal and the commit marker to the standby control unit and communicates a portion of the replicated temporally-ordered data structure that is bounded by the commit proposal and the commit marker to the consumer from the standby control unit in the event the primary control unit fails.

Claim 36 (Previously Presented) The device of claim 35, wherein the primary control unit issues a communication that causes the standby control unit to set the replicated commit proposal to identify a most recent object of the temporally-ordered replicated data structure that has not been acknowledged by the consumer.

Claim 37 (Currently Amended) The device of claim 36, wherein the primary control unit issues a another communication that causes the standby control unit to set the replicated commit marker to identify a most recent object of the temporally-ordered replicated data structure that has been communicated to the consumer and for which an acknowledgement has been received from the consumer.

Claim 38 (Currently Amended) The device of claim 37, wherein the other communication that causes the standby control unit to set the replicated commit marker further causes the standby control unit to set the replicated commit marker to the object identified by the replicated commit proposal in response to receiving the acknowledgement.

Claim 39 (Previously Presented) The device of claim 30, wherein the primary control unit utilizes the commit marker and the commit proposal to delete a least recent object of the temporally ordered data structure that does not include the commit marker and the commit proposal.

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Claim 40 (Currently Amended) The device of claim 28,

wherein the change comprises one change of a plurality of changes.

wherein the primary control unit receives event messages indicating the changes to the state information, and links objects of the data structure in accordance with an order in which the event messages are received to form the temporally-ordered data structure.

Claim 41 (Previously Presented) The device of claim 26, wherein the primary control unit manages state information by storing the state information within a set of objects.

Claim 42 (Currently Amended) A device comprising:

a consumer;

a memory to store state information; and

a control unit to maintain the state information within a temporally-ordered data structure,

wherein the control unit communicates a portion of the state information that corresponds to a change in the state information to the consumer so as to update consumer state information maintained by the consumer with the change, and encodes a commit proposal and a commit marker within the data structure to identify the portion of the state information within the temporally-ordered data structure, and

wherein the state information comprises information ~~(i) representing a current state the consumer included within the device, (ii) updated by the control unit during operation of the consumer within the device, and (iii) upon a transfer of control of the device from the control unit to a standby control unit, utilized by the standby control unit to take control of the device from the primary control unit without having to relearn the state information.~~

Claim 43 (Previously Presented) The device of claim 42, wherein the control unit sets the commit proposal to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer, and sets the commit marker to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer and for which an acknowledgement has been received from the consumer.

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Claim 44 (Previously Presented) The device of claim 43, wherein the control unit sets a flag that indicates to the consumer that the commit proposal has been set.

Claim 45 (Previously Presented) The device of claim 43, wherein the control unit receives an update request from the consumer, identifies a portion of the temporally-ordered data structure that contains objects more recent than the object identified by the commit proposal, and communicates state data for the identified objects to the consumer in response to the request.

Claim 46 (Previously Presented) The device of claim 45, wherein the control unit updates the commit proposal to identify the most recent of the identified objects of the temporally-ordered data structure.

Claim 47 (Previously Presented) The device of claim 46, wherein the control unit receives an acknowledgement from the consumer and updates the commit marker to identify the object identified by the commit proposal in response to the acknowledgement.

Claim 48 (Currently Amended) The device of claim 42,
wherein the control unit is a primary control unit, and the system further comprises a standby control unit, and
wherein the primary control unit communicates the change[[s]] to the state information in accordance with an order that requires the change[[s]] to be communicated to the standby control unit before communicating the change[[s]] to the consumer.

Claim 49 (Previously Presented) The device of claim 42, wherein the data structure comprises a plurality of objects, and the control unit manages the state information by storing the state information within the objects.

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Claim 50 (Currently Amended) The device of claim 49,
wherein the change comprises one change of a plurality of changes, and
wherein the control unit further receives event messages indicating the changes to the
state information and links the objects of the data structure in accordance with an order in which
the event messages are received.

Claim 51 (Currently Amended) A computer-readable medium comprising instructions for
causing a primary control unit to:

manage state information stored within the primary control unit included within a device,
wherein the state information comprises information (i) representing a current state of the
consumer included within the device, ~~(ii) updated by the primary controller during operation of
the consumer within the device, and (iii) upon a transfer of control of the device from the primary
control unit to a standby control unit included within the device, utilized by the standby control
unit to take control of the device from the primary control unit without having to relearn the state
information; and~~

receive a change to the state information; and

communicate the change[[s]] to the state information in accordance with an order that
requires the changes to be communicated to the standby control unit before communicating the
changes to the consumer of the state information included within the device such that the state
information is synchronized between the primary and standby control units; and

after synchronizing the state information between the primary and standby control units,
communicate the change to the consumer to update consumer state information maintained
within the consumer with the change.

Claim 52 (Currently Amended) The computer-readable medium of claim 51, wherein the
instructions cause the primary control unit to:

manage the state information within a temporally-ordered data structure, and

communicate the change[[s]] by replicating the temporally-ordered data structure within
the standby control unit.

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Claim 53 (Currently Amended) The computer-readable medium of claim 52, wherein the instructions cause the primary control unit to manage the state information by utilizing a commit proposal and a commit marker to identify a portion of the state information within the data structure that has been communicated to the consumer.

Claim 54 (Original) The computer-readable medium of claim 53, wherein the instructions cause the primary control unit to:

set the commit proposal to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer; and

set the commit marker to identify a most recent object of the temporally-ordered data structure that has been communicated to the consumer and for which an acknowledgment has been received from the consumer.

Claim 55 (Currently Amended) The computer-readable medium of claim ~~[[55]]~~54, further comprising instructions to cause the primary control unit to replicate the commit proposal and the commit marker to the standby control unit.

Claim 56 (Previously Presented): The method of claim 1,
wherein the device comprises a router, and
wherein the consumer comprises a forwarding component.

Claim 57 (Previously Presented): The method of claim 16,
wherein the device comprises a router, and
wherein the consumer comprises a forwarding component.

Claim 58 (Previously Presented): The device of claim 26,
wherein the device comprises a router, and
wherein the consumer comprises a forwarding component.

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Claim 59 (Previously Presented): The device of claim 42,
wherein the device comprises a router, and
wherein the consumer comprises a forwarding component.